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ODONTOPTERIS GENUINA IN RHODE ISLAND

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(WITH FIVE FIGURES)

One of the most characteristic and common fossils of Rhode Island is *Odontopteris genuina* Grand'Eury. These plants apparently grew to great size around the coal swamps of the Narragansett Basin during the Carboniferous, somewhat like the tree ferns of the tropical forests of the present day (fig. 1). The fronds appear to have been bifurcate, the angle formed by the branches being about 90° (fig. 2). The rachis is striated and clothed with short pinnae, the latter having enlarged pinnules at their tips and being more separated than those of the expanded parts of the frond. The pinnae vary considerably, sometimes being short or at other times attaining a length of over 15 cm. The pinnules often vary in shape on the same specimen, some being falcate and acute, while others are oval and rounded at their apices. The acute type of *O. genuina* is very common in the state, and may have come about as a result of the conditions under which the fossils were originally imbedded. The pinnules appear to have been firm in texture and convex or "bombe" in shape. If these shapes were squarely imbedded they would appear oval (fig. 3a) when fossilized, while more pointed effects would result from preservation at a slight angle (fig. 3b; fig. 4a, b), and long, narrow effects from still greater angles (fig. 5a). While these forms have pinnules 3–8 mm. broad by 10–16 mm. long, the illustrations from Pawtucket show much larger sizes and resemble those figured by ZEILLER¹ from Commentry, France. The Pawtucket specimens do not appear to have been as firm and thick as the smaller Rhode Island types, and the borders are inclined to be less even. The pinnules also were evidently flat rather than convex in shape and somewhat cyclopterid in appearance (fig. 3c, d; fig. 5b).

¹ ZEILLER, C. R., *Études sur le Terrain Houiller de Commentry*. pl. 24. 1888.

It appears that *O. genuina* has frequently been listed among Rhode Island fossils under the name *O. brardii* Brgt., presumably



FIG. 1.—*Odontopteris genuina*: tip of frond (distorted); reduced $\frac{1}{2}$.

owing to the numerous examples of falcate forms in evidence. A careful study of the veining upon good material, however,

reveals a much more complex system than that of *O. brardii*.² In general the *O. genuina* has a thin medial nerve, distinct almost to the apex, while the lateral veins spread at very acute angles

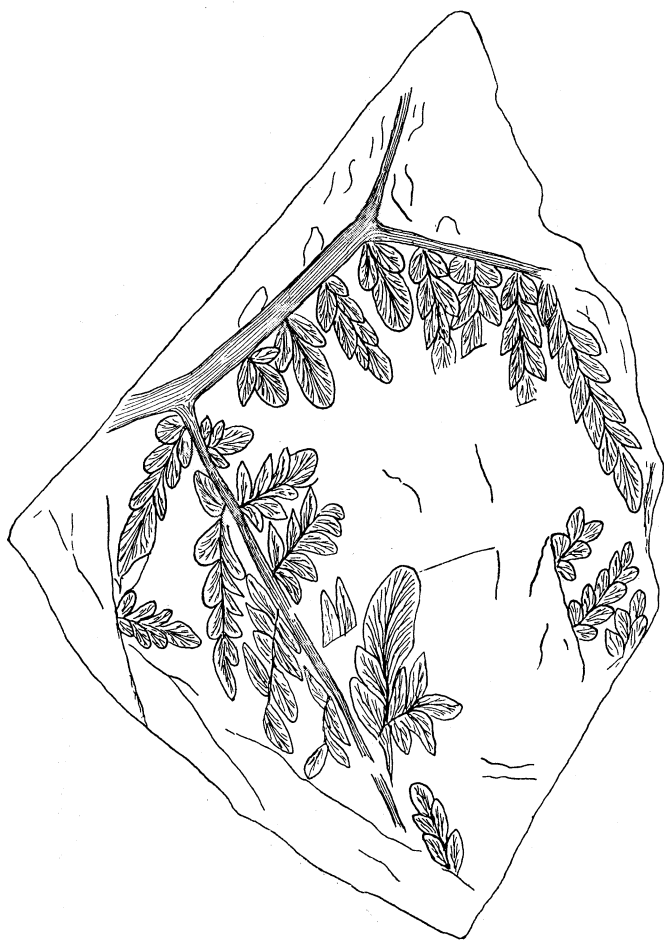


FIG. 2.—*Odontopteris genuina*: mode of branching; reduced $\frac{1}{2}$.

and fork in passing to the border one to four times, the lowest or outermost only coming from the rachis. Typical *O. brardii*, on the other hand, is described as having veins all of which come

² BRONGNIART, A., Histoire des végétaux fossiles. pls. 75, 76. 1828.

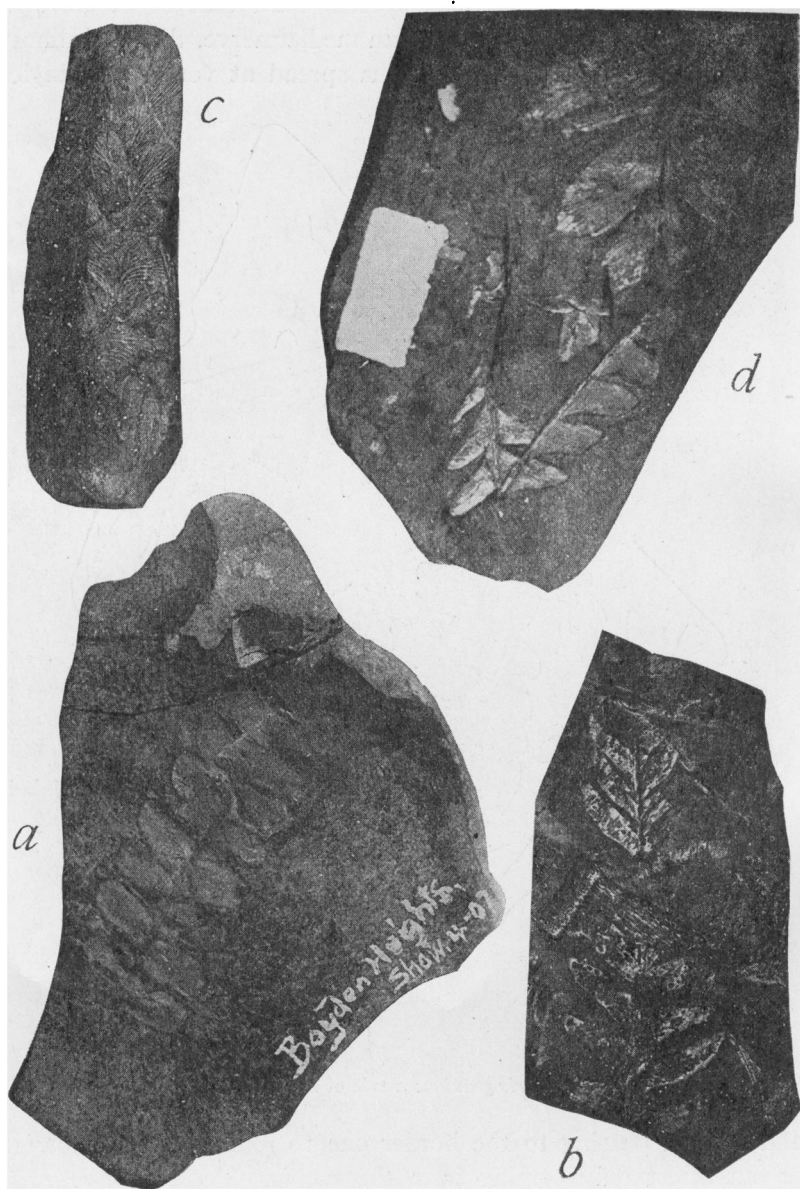


FIG. 3.—*Odontopteris genuina*: slightly reduced.



FIG. 4.—*Odontopteris genuina*: a, natural size; b, $\times 2$.

from the rachis, a condition which the writer has never observed in Rhode Island specimens.



FIG. 5.—*Odontopteris genuina*: natural size.

Odontopteris genuina has been found in eight localities in the state, namely, Portsmouth, Boyden Heights, The Tunnel, Provi-

dence, Pawtucket, Arlington, Cranston, and Warwick. These rocks are now in the collection of the geological department of Brown University. As they never appear waterworn it may be inferred that these plants fringed the coal marshes of the Narragansett Basin in the Carboniferous, and were buried and fossilized near their places of growth. Most of these fossiliferous materials are preserved in fine grained black shale. The specimen from Boyden Heights, however, is of sandstone, a material not generally fossiliferous in the state except as the matrix of coarse forms like *Calamites* (fig. 3a).

With such abundance of preserved material as is represented by *O. genuina* in Rhode Island, it seems significant that no fruited pinnae are in evidence. It has been proved by KIDSTON,³ however, that many of the so-called fossil "ferns" were really Pteridosperms or Cycadofilicales. Many detached seeds are found in the rocks of Rhode Island, proof that the ancestors of modern flowering plants were denizens of the coal forests of the state, among which it seems probable that *O. genuina* may sometime be included.

³ KIDSTON, R., Les végétaux houillers recueillis dans le Hainaut belge. Mém. Mus. Roy. Hist. Nat. Belg. 4:5. 1911.